We Claim:

1. A method of probing a material under investigation comprising the steps of:

using a plurality of transducers to transmit an ultrasound beam into the material under investigation, the ultrasound beam including components generated by each transducer in the plurality of transducers;

receiving echoes generated by interactions between the ultrasound beam and the material under investigation;

generating first data from the received echoes, the first data having values that include phase and magnitude information and being associatable with a time dimension and distributed over at least one spatial dimension;

using the phase or magnitude information to distinguish echoes, among the received echoes, resulting from ultrasound beam components generated by a subset of transducers in the plurality of transducers; and

transforming the first data into second data using the distinguished echoes, the second data having values distributed over at least one more spatial dimension than the first data.

2. The method of claim 1, wherein the magnitude information is used to distinguish echoes among the received echoes.

3. The method of claim 1, wherein both the magnitude and phase information are used to distinguish echoes among the received echoes.

4. The method of claim 1, wherein the phase information is used to distinguish echoes among the received echoes.

5. The method of claim 4, wherein the ultrasound beam is configured to probe a region of interest including two or more spatial dimensions.

6. The method of claim 5, further including a step of transmitting an additional ultrasound beam into the material under investigation, the additional beam being configured to probe a second region of interest overlapping the region of interest including two or more spatial dimensions.

7. The method of claim 5, further including the steps of

transmitting an additional ultrasound beam into the material under investigation, the additional beam configured to probe a second region of interest overlapping the region of interest including two or more spatial dimensions,

receiving second echoes generated by interactions between the additional ultrasound beam and the material under investigation,

generating third data using the received second echoes, and

generating an image using both the second data and the third data.

8. The method of claim 4, further including a step of configuring the ultrasound beam responsive to an imaging mode.

9. The method of claim 4, further including the steps of generating electronic signals from the received echoes using receiving transducers and of amplifying the generated electronic signals using a weighting function with a factor responsive to an identity of a member of a set of receiving transducers.

10. The method of claim 9, wherein the weighting function is responsive to the identity of a main contributing element.

11. The method of claim 1, wherein the step of transforming the first data includes a multidimensional data transform.

12. A method of probing a material under investigation comprising the steps of:

transmitting one ultrasound beam into the material under investigation;

receiving echoes generated by interactions between the ultrasound beam and the material under investigation;

generating first data from the received echoes, the first data having a value that includes phase and magnitude information and associatable with time and at least a first spatial dimension; and

transforming a portion of the first data into second data using a transform capable of producing second data distributed over at least a second spatial dimension and a third spatial dimension, the transform using the phase or magnitude information to select the portion of first data to be transformed.

13. The method of claim 12, wherein both the magnitude and phase information are used to distinguish echoes among the received echoes.

14. The method of claim 12, wherein the phase information is used to distinguish echoes among the received echoes.

15. The method of claim 14, wherein the first spatial dimension is the same as the second spatial dimension.

16. The method of claim 14, further including a step of determining characteristics of an ultrasound beam configured to analyze an area within the material under investigation.

17. The method of claim 12, further including a step of determining an area to be probed by the ultrasound beam, the second data being distributed over the area.

18. The method of claim 12, wherein the transform includes determining a data location line using the location of a main contributing element.

19. The method of claim 18, wherein the data location line is curved.

20. The method of claim 18, wherein the data location line does not intersect the main contributing element.

21. The method of claim 12, wherein the step of transforming the first data includes a transform that uses correlation analysis.

22. The method of claim 12, wherein the step of transforming the first data includes determination of a main contributing element.

23. The method of claim 12, wherein the step of transforming the first data includes consideration of a secondary contributing element.

24. The method of claim 12, further including a step of transmitting an additional ultrasound beam, the step of transforming the first data occurring before the step of transmitting the additional ultrasound beam.

25. A method of probing a material under investigation comprising the steps of:

transmitting one or more ultrasound beam into the material under investigation;

receiving first echoes generated by interactions between one of the transmitted one or more ultrasound beam and the material under investigation, the interactions occurring at points distributed over at least a first spatial dimension and a second spatial dimension;

generating first data from the received first echoes, the first data having values distributed in a time dimension and additionally distributed over at least the first or the second spatial dimension;

transforming the first data into second data having values distributed over at least both the first and the second spatial dimension;

transmitting an other ultrasound beam into the material under investigation;

receiving further echoes generated using the other ultrasound beam;

generating third data using the received further echoes, the third data being echolocation data and having a dimensionality; and

combining the third data with the second data, the combination having the same dimensionality as the third data.

26. The method of claim 25, wherein characteristics of the other ultrasound beam are modified according to an algorithm that processes the second data.

27. The method of claim 25, wherein the step of combining the second data and the third data improves the signal to noise ratio in a resulting image over the signal to noise ratio of a resulting image that may be generated using only the second data or only the third data.

28. The method of claim 25, wherein the step of transmitting the other ultrasound beam is responsive to the second data.

29. The method of claim 25, further including the step of configuring the one or more of the transmitted beam responsive to an imaging mode.

30. The method of claim 25, further including a step of determining an area to be probed using the one or more ultrasound beam.

31. The method of claim 25, wherein the step of transforming the first data includes using a data transform with a weighting function responsive to an identity of a main contributing element.

32. The method of claim 25, wherein the second data is indexed using a coordinate system responsive to a shape of the one or more ultrasound beam.

33. A method of probing a material under investigation comprising the steps of:

transmitting an ultrasound beam into the material under investigation;

receiving echoes generated by interactions between the transmitted ultrasound beam and the material under investigation;

generating first data using the received echoes, the first data having values associatable with time and a number of positions in a first spatial dimension, the number of positions being at least 64 and the association with the number of positions being independent of the association with time; and

transforming the first data into second data having values associatable with at least the first spatial dimension and a second spatial dimension.

34. The method of claim 33, wherein the number of positions is at least 128.

35. The method of claim 33, wherein the number of positions is at least 256.

36. The method of claim 33, further including the step of receiving second echoes generated by interactions between a second ultrasound beam and the material under investigation.

37. The method of claim 36, further including the step of generating third data using the received second echoes, any combination of the first data and the third data having the same dimensionality as the first data.

38. The method of claim 33, wherein the second data is echolocation data.

39. A method of generating echolocation data comprising the steps of:

generating first data by converting echoes into electronic signals, the first data having a plurality of values associatable with time and separately associatable with a plurality of positions in at least one spatial dimension, the plurality of values including phase and magnitude information; and

generating the echolocation data using the first data and a data transform responsive to the phase or magnitude information, the echolocation data having at least one value derived from two or more members of the plurality of values associatable with different positions in the plurality of positions.

40. The method of claim 39, wherein the at least one value is not generated using interpolation between members of the plurality of values.

41. The method of claim 39, wherein a plurality of values in the echolocation data are each derived from members of the plurality of values having different positions in the at least one spatial dimension.

42. The method of claim 39, wherein the echoes are received by a plurality of transducer elements and the different positions of the two or more members of the plurality of values are separated by at least twice the shortest distance between any two members of the plurality of transducer elements.

43. The method of claim 39, wherein the data transform is responsive to the phase information.